

INFLUENCE OF GRAVITY ON THE BLOOD CIRCULATION;
DIAGNOSTICS OF SYNCOPE AND APOPLEXY

Piorry

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A paper on experiments to determine the possible causes of syncope is abstracted. Human subjects, in true syncope, were revived by changing their erect position to a horizontal position, with the head lower than the trunk, indicating a clear influence of gravity. Bichat's theory that syncope is produced by suspension of cardiac action is disputed, emphasizing that interruption of blood flow to the brain is the primary cause.

Butha

Piorry, Assistant Resident of the Section of Medicine, presented a paper on a topic discussed below: 1) The first portion of the paper refers to three observations on human subjects in the state of syncope, who were revived by merely changing their sitting position to a supine position, keeping the head lower than the trunk. The author then lists the results of experiments made /293 recently at the Academy (see Vol.X of the Archives, pp.138ff.; 308ff.), namely that, on opening the two jugular veins of a dog, the hemorrhage can be restored, after the blood has stopped flowing, by raising the hind part of the animal. In this experiment, the loss of blood caused syncope of the animal which could be either stopped or started at will by keeping the head low with the hind part elevated or, conversely, by raising the head and lowering the hind part. From these preliminary results, Piorry concluded that gravity exerts an influence on

* Numbers in the margin indicate pagination in the original foreign text.

the blood circulation of the animals, which is more pronounced the weaker the animal becomes. He cited also other proofs such as the dilatation of the veins and capillary vessels at points where the blood is forced to flow against the direction of gravity; other proofs included congestions of blood that, on approach of death, are produced in the organs located at the lowest portion of the body, etc. 2) Piorry then disputed the theory established by Bichat, namely, that the syncope is due to a suspension of cardiac action; he found that, even if the hemorrhage is the immediate cause of the syncope, the latter is lastly due to a suspension of action of the brain. In fact, in any syncope, the cerebral action stops long before that of the heart. The cardiac action continues for quite some time in any syncope. Depending on whether the head is raised or lowered, i.e., on whether one hinders or facilitates the flow of blood to the brain, the syncope will be accelerated or retarded. One only has to recall the numerous cases in which fainting takes place for mental reasons; one can certainly not say that these had primarily affected the heart. Thus, it can be stated that syncope is due to a suspension of cerebral action, i.e., to a psychic involvement or to an interruption of the blood supply to the brain.

3) In a third portion of his paper, Piorry states that a diagnostic differentiation between syncope and cerebral congestion is frequently doubtful since the symptoms caused by a suspension of cerebral action are the same, no matter whether this suspension had been caused by interruption of the blood flow to the brain or by a compression of the brain vessels through excessive supply of blood. However, the author mentioned specifically that it is of great importance to differentiate the two cases since, in the one case, bloodletting would be detrimental and, in the other case, highly useful. He emphasizes that clarity as to the effects of this situation is of importance. Horizontal position of

the body is beneficial in the case of syncope and detrimental in apoplexy. Conversely, a vertical attitude is harmful in the first case and favorable in the second case. Piorry terminates his paper by stating that not only a horizontal position of the head but a downward inclination is the best curative means for syncope.

The paper was followed by a discussion. Ségalas, on the basis of his own experiments, confirmed the statements made by Piorry as to the influence exerted on the syncope, by an elevated or lowered position of the head with respect /294 to the rest of the body, in experiments on living animals. He mentioned that, on injecting large amounts of air or oil into the veins of an animal, or else a substance not miscible with the blood, the heart will dilate; since the syncope in this case will start from the heart, the physiognomy is different from that started by the brain: The animal does not stop moving instantly and continues whimpering for some time. Desgenettes mentioned the well-known fact that, on taking blood from a human subject in an erect position, fainting can be avoided only in rare cases no matter how robust the person might be. He knew of a surgeon who practices this type of bloodletting in cases of luxation so as to facilitate the reduction. Castel mentioned that, for quite some time, he had rejected Bichat's opinions on the cause of syncopes. He is convinced that syncopes may have various starting points, originating in the stomach if hunger was the cause, starting from the heart when following a hemorrhage, and beginning in the brain when produced by a mental affection. The fact that a state of weakness might make a drooping position of the head more advantageous clearly indicates - as stated by him - that physical forces come to the aid of the diminished vital forces. Villermé substantiated Piorry's theory on the syncope by mentioning that a hot footbath, applied at the moment of bloodletting, will

• almost always produce syncope. He mentioned that it was regrettable that Piorry had not been able to assemble more actual facts in his work.